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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Gary Dean Martinie

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04/22/2009

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EXAMINER

ROBINSON, RENEE E

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/583,784	Applicant(s) MARTINIE ET AL.	
	Examiner RENEE ROBINSON	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20080208, 20070209</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: claim 10 refers to “bubbling the hydrocarbon stream”; however there is no support in the specification to provide a clear description of what is intended by the claimed bubbling step.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 10 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 10 and 12 recite the limitation "the reactive extractive agent" in line 3 and lines 2-3, respectively. There is insufficient antecedent basis for this limitation in the claim, since there is no prior mention of a *reactive* extractive agent.

5. Regarding claim 10, it is unclear what is meant by the limitation “bubbling” in line 2. It is unclear whether this limitation intends to refer to boiling the hydrocarbon stream, creating bubbles by agitating or injecting a gas into the hydrocarbon stream, or whether something else is meant by “bubbling”.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 6, 10, 12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ou (U.S. Patent 5,167,797).

8. Regarding claims 1, 2 and 6, Ou discloses a process for the removal of sulfur compounds from a liquid hydrocarbon stream, comprising contacting the liquid hydrocarbon stream with an aqueous extractive agent comprising chlorine containing compounds under conditions and for a period of time which is effective to reduce the sulfur content of the hydrocarbon stream (col. 1, lines 8-15; col. 4, lines 30-65; Table 1).

9. Regarding claim 3, Ou discloses that the sulfur compounds are selected from the group consisting of hydrogen sulfide, mercaptans, sulfides, and disulfides, and mixtures thereof (col. 6, line 66 – col. 7, line 2).

10. Regarding claim 10, Ou discloses pumping the hydrocarbon stream through a contactor containing the aqueous solution of the reactive extractive agent (col. 8, lines 20-29). The contactor comprises a packed column and the hydrocarbon stream is pumped upwardly through the contactor, which would inherently cause bubbling of the hydrocarbon stream as it passes through the packed column contactor (Fig. 4; col. 6, lines 20-29).

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11. Regarding claim 12, Ou discloses that the liquid hydrocarbon stream is stirred and/or agitated by, for example, static mixers in a contactor containing aqueous solution of the reactive extractive agent (col. 7, lines 65-68).

12. Regarding claim 14, Ou discloses that the sulfur content in the hydrocarbon stream is reduced to 5ppm or less ($< 1\text{ppm}$) (Table 1).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ou (U.S. Patent 5,167,797) in view of Oakes (U.S. Patent 4,473,115).

17. Ou is relied upon as set forth above in the rejection of claim 1.

18. Regarding claims 4 and 5, Ou does not expressly disclose that the chlorine containing compounds are selected from the group consisting of sodium hypochlorite, calcium hypochlorite, hypochlorous acid, salts and acid forms of mixed oxides of chlorine, and mixtures thereof.

19. Oakes discloses a method for reducing the concentration of hydrogen sulfide in subterranean well fluids, which include liquid hydrocarbons, comprising contacting the well fluid with an aqueous chlorine dioxide solution (Abstract). Oakes teaches that the chlorine dioxide solution is stable and allows for complete reaction of the chlorine dioxide and hydrogen sulfide (col. 3, lines 60-62). Further, the aqueous chlorine dioxide produces very little environmentally harmful effects (col. 4, lines 3-5).

20. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the process as disclosed by Ou by using an aqueous solution of chlorine dioxide as the extractive agent for removing sulfur compounds such as hydrogen sulfide, as suggested by Oakes. One having ordinary skill would have been motivated to do this because Oakes teaches that aqueous chlorine dioxide allows for complete reaction with sulfur compounds and produces very little harmful effects.

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21. Claims 7-9, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ou (U.S. Patent 5,167,797) in view of Eberly, Jr. (U.S. Patent 4,592,829).

22. Ou is relied upon as set forth above in the rejection of claims 1, 10 and 12.

23. Regarding claims 7-9, 11 and 13, Ou discloses contacting the hydrocarbon stream in the presence of an adsorbent saturated with the chlorine containing compound (col. 8, lines 16-24). However, Ou does not expressly disclose that the adsorbent is supporting a catalyst.

24. Eberly discloses a process for the desulfurization of hydrocarbons comprising contacting a hydrocarbon stream containing sulfur compounds with a supported catalyst or sorbent, thereby providing a hydrocarbon stream with a lower sulfur concentration (col. 3, lines 24-31). The catalytic sorbent comprises metals such as iron and nickel supported on a refractory inorganic oxide, such as silica, alumina, and clays (col. 3, lines 12-23). The resulting hydrocarbon stream contains less than 0.1 ppm sulfur, which is an immeasurable amount (col. 5, lines 64-68).

25. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the process as disclosed by Ou such that the sorbent supports a catalytic metal, as suggested by Eberly. One having ordinary skill would have been motivated to do this in order to further reduce the amount of sulfur in the hydrocarbon stream to immeasurable amounts.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RENEE ROBINSON whose telephone number is (571)270-7371. The examiner can normally be reached on Monday through Thursday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571)272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. R./
Examiner, Art Unit 1797

/Walter D. Griffin/
Supervisory Patent Examiner,
Art Unit 1797